

Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (currently amended): A nozzle for an injection molding apparatus, comprising:

a nozzle body, said nozzle body defining a nozzle body melt passage, said nozzle body melt passage having an inlet ~~that is adapted to be~~ downstream from and in fluid communication with a melt source;

a heater ~~that is connected~~coupled to said nozzle body ~~for heating melt in said nozzle body melt passage~~;

a tip, said tip defining a tip melt passage ~~that is~~ downstream from and in communication with said nozzle body melt passage, said tip ~~felt~~ melt passage having an outlet ~~that is~~ upstream from a gate in a mold component, said ~~nozzle~~ tip including a tip gap seal surface; and

a tip retainer, wherein ~~said tip retainer retains~~ said tip is retained in position with respect to the nozzle body via said tip retainer and[[,]] wherein said tip retainer includes a first tip retainer gap seal surface,

wherein said first tip retainer gap seal surface and said tip gap seal surface are separated by a first gap[[,]] and said first gap is sized to inhibit the flow of melt therein.

2. (original): A nozzle as claimed in claim 1, wherein said tip is made from a thermally conductive material.

3. (original): A nozzle as claimed in claim 2, wherein said tip retainer is made from a material that is less thermally conductive than the material of said tip.

4. (currently amended): A nozzle as claimed in claim 1, further comprising a seal between ~~wherein said tip retainer is configured to cooperate with~~ and said mold component ~~to form a seal therewith to inhibit melt leakage therepast.~~

5. (original): A nozzle as claimed in claim 1, wherein said tip retainer is configured to cooperate with said mold component to align said nozzle with respect to said gate.

6. (currently amended): A nozzle as claimed in claim 1, wherein the size of the first gap is between approximately .02 mm and ~~approximately~~ .07 mm.

7. (currently amended): A nozzle as claimed in claim 1, wherein the tip further includes a tip mechanical seal surface adjacent the tip gap seal surface and wherein the tip retainer further includes a ~~first~~ tip retainer mechanical seal surface adjacent the first tip retainer gap seal surface, wherein said tip mechanical seal surface engages the tip retainer mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and the tip retainer mechanical seal surface are positioned upstream of said tip retainer ~~behind said first and second gap seal surfaces with respect to exposure to melt.~~

8. (currently amended): A nozzle as claimed in claim 7, wherein the size of the first gap is between approximately .05 mm and ~~approximately~~ .35 mm.

9. (currently amended): A nozzle as claimed in claim 7, wherein the size of the first gap is approximately .15 mm.

10. (currently amended): A nozzle as claimed in claim 1, wherein the tip includes a conical portion that ~~is configured to extend~~ extends into the gate.

11. (currently amended): A nozzle for an injection molding apparatus, comprising:

a nozzle body, said nozzle body defining a nozzle body melt passage, ~~said nozzle body melt passage~~ having an inlet ~~that is adapted to be~~ downstream from and in fluid communication with a melt source;

a heater ~~that is connected~~ coupled to said nozzle body ~~for heating melt in said nozzle body melt passage~~;

a tip, said tip defining a tip melt passage ~~that is~~ downstream from said nozzle body melt passage, said tip melt passage having an outlet ~~that is~~ upstream from a gate in a mold component, said nozzle tip including a tip gap sealing surface; and

a seal piece ~~removably~~ connected to said nozzle body, including a seal between ~~wherein~~ said seal piece and is configured to cooperate with said mold component ~~to form a seal therewith to inhibit~~, wherein said seal inhibits melt leakage therepast, wherein said tip ~~retainer~~ seal piece includes a first seal piece gap seal surface,

wherein said first seal piece gap seal surface and said tip gap seal sealing surface are separated by a first gap[[,]] and said first gap is sized to inhibit the flow of melt therein.

12. (original): A nozzle as claimed in claim 11, wherein said tip is made from a thermally conductive material.

13. (original): A nozzle as claimed in claim 12, wherein said seal piece is made from a material that is less thermally conductive than the material of said tip.

14. (original): A nozzle as claimed in claim 11, wherein said seal piece is configured to cooperate with said mold component to align said nozzle with respect to said gate.

15. (currently amended): A nozzle as claimed in claim 11, wherein said ~~seal piece retains~~ said tip is retained in position with respect to the nozzle body via said seal piece.

16. (currently amended): A nozzle as claimed in claim 11, wherein said tip is removably connected to said nozzle body, ~~and wherein said seal piece and said tip are entirely free of contact with each other.~~

17. (currently amended): A nozzle as claimed in claim 11, wherein the size of said first gap is between approximately .02 mm and ~~approximately~~ .07 mm.

18. (currently amended): A nozzle as claimed in claim 11, wherein the tip further includes a tip mechanical seal surface adjacent the tip gap seal surface and wherein the ~~tip~~ retainer seal piece further includes a ~~first tip retainer seal piece~~ mechanical seal surface adjacent the ~~first tip retainer seal piece~~ gap seal surface, wherein said tip mechanical seal

surface engages the ~~tip-retain~~seal piece mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and ~~tip-retain~~the seal piece mechanical seal ~~surfaces~~surface are positioned upstream from said seal piece ~~behind said first and second gap seal surfaces with respect to exposure to melt.~~

19. (currently amended): A nozzle as claimed in claim 18, wherein the size of the first gap is between approximately .05 mm and approximately .35 mm.

20. (currently amended): A nozzle as claimed in claim 18, wherein the size of the first gap is approximately .15 mm.

21. (currently amended): A nozzle as claimed in claim 11, wherein the tip includes a conical portion that ~~is configured to extend~~ extends into the gate.

22. (currently amended): A nozzle for an injection molding apparatus, comprising:

a nozzle body, said nozzle body defining a nozzle body melt passage, said nozzle body melt passage having an inlet ~~that is adapted to be~~ downstream from and in fluid communication with a melt source;

a heater ~~that is connected~~coupled to said nozzle body ~~for heating melt in said nozzle body melt passage;~~

a tip, said tip defining a tip melt passage ~~that is~~ downstream from and in communication with said nozzle body melt passage, said tip melt passage having an outlet

that is upstream from a gate in a mold component, said ~~nozzle~~ tip including a tip sealing surface;

a tip retainer ~~removably~~ connected to the nozzle body, wherein ~~said tip retainer retains~~ said tip is retained in position with respect to the nozzle body via said tip retainer and[[,]], wherein said tip retainer includes a ~~first~~ tip retainer sealing surface; and

a seal piece connected to said tip retainer, including a seal between ~~wherein said seal piece is configured to cooperate with and said mold component to form a seal therewith to inhibit~~, wherein said seal inhibits melt leakage therepast, ~~and wherein said seal piece includes a first seal piece sealing surface,~~

wherein said ~~first seal piece~~ tip retainer sealing surface and said tip sealing surface are separated by a first gap[[,]] and said first gap is sized to inhibit the flow of melt therein.

23. (original): A nozzle as claimed in claim 22, wherein said tip is made from a thermally conductive material.

24. (original): A nozzle as claimed in claim 23, wherein said tip retainer is made from a thermally conductive material, and wherein said seal piece is made from a material that is less thermally conductive than the material of said tip retainer.

25. (currently amended): A nozzle as claimed in claim 22, wherein said first gap size is between approximately .02 mm and ~~approximately~~ .07 mm.

26. (currently amended): A nozzle as claimed in claim 22, wherein the tip further includes a tip mechanical seal surface adjacent the tip ~~gap-seal~~ sealing surface and wherein the tip retainer further includes a ~~first~~ tip retainer mechanical seal surface adjacent the tip retainer ~~gap-seal~~ sealing surface, wherein said tip mechanical seal surface engages the tip retainer mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and the tip retainer mechanical seal ~~surfaces~~ surface are positioned upstream from said tip retainer ~~behind said first and second gap-seal surfaces with respect to exposure to melt.~~

27. (currently amended): A nozzle as claimed in claim 26, wherein the size of the first gap is between approximately .05 mm and ~~approximately~~ .35 mm.

28. (currently amended): A nozzle as claimed in claim 26, wherein the size of the first gap is approximately .15 mm.

29. (currently amended): A nozzle as claimed in claim 22, wherein the tip includes a conical portion that ~~is configured to extend~~ extends into the gate.

30. (currently amended): An injection molding apparatus, comprising:

a mold component and at least one nozzle;

wherein the mold component defines at least one mold cavity having a gate leading thereto and includes a mold component gap seal surface,

wherein the at least one nozzle includes a nozzle body, a heater, a tip and a tip retainer,

wherein the nozzle body defines a nozzle body melt passage, said nozzle body melt passage having an inlet ~~that is adapted to be~~ downstream from and in fluid communication with a melt source;

wherein the heater ~~that is connected~~coupled to said nozzle body ~~for heating melt in said nozzle body melt passage~~;

wherein the tip defines a tip melt passage ~~that is~~ downstream from and in communication with said nozzle body melt passage, said tip melt passage having an outlet that is upstream from ~~one of~~ the at least one gate, said nozzle tip including a tip gap seal surface; and

wherein ~~the tip retainer retains~~ said tip is retained in position with respect to the nozzle body via said tip retainer and[[,]] wherein said tip retainer includes a first tip retainer gap seal surface and a second tip retainer gap seal surface,

wherein said first tip retainer gap seal surface and said tip gap seal surface are separated by a first gap and said second tip retainer gap seal surface and said mold component gap seal surface are separated by a second gap, and said first gap and said second gap ~~is~~are sized to inhibit the flow of melt therein.

31. (original): A nozzle as claimed in claim 30, wherein said tip is made from a thermally conductive material.

32. (original): A nozzle as claimed in claim 31, wherein said tip retainer is made from a material that is less thermally conductive than the material of said tip.

33. (cancelled).

34. (original): A nozzle as claimed in claim 30, wherein said tip retainer is configured to cooperate with said mold component to align said nozzle with respect to said gate.

35. (currently amended): A nozzle as claimed in claim 30, wherein the size of ~~the~~ one of said first gap and second gap is between approximately .02 mm and ~~approximately~~ .07 mm.

36. (currently amended): A nozzle as claimed in claim 30, wherein the tip further includes a tip mechanical seal surface adjacent the tip gap seal surface and wherein the tip retainer further includes a ~~first~~ tip retainer mechanical seal surface adjacent the first tip retainer gap seal surface, wherein said tip mechanical seal surface engages the tip retainer mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and tip retainer mechanical seal ~~surfaces~~surface are positioned upstream from said tip retainer ~~behind said first and second gap seal surfaces with respect to exposure to melt~~.

37. (currently amended): A nozzle as claimed in claim 36, wherein the size of the first gap is between approximately .05 mm and ~~approximately~~ .35 mm.

38. (currently amended): A nozzle as claimed in claim 36, wherein the size of the first gap is approximately .15 mm.

39. (cancelled).

40. (currently amended): A nozzle as claimed in claim ~~[[39]]~~ 30, wherein the tip includes a conical portion that ~~is configured to extend~~ extends into the gate.

41. (currently amended): A nozzle as claimed in claim 40, wherein the nozzle and the mold component together define a chamber surrounding the gate, and wherein the tip retainer further includes a first tip retainer mechanical seal surface and the mold component further includes a mold component mechanical seal surface, wherein said tip retainer mechanical seal surface is adapted to engage a engages said mold component mechanical seal surface on the mold component to form a mechanical seal, and wherein the ~~first and second tip retainer mechanical seal surfaces~~ surface and the mold component mechanical seal surface are positioned adjacent said second gap~~behind said first and second gap seal surfaces with respect to the chamber~~.

42. (new): A nozzle as claimed in claim 1, wherein said tip is removably retained in position with respect to the nozzle body via seal tip retainer.

43. (new): A nozzle as claimed in claim 4, wherein said tip retainer includes a second tip retainer gap seal surface and said mold component includes a mold component gap seal

surface and wherein said second tip retainer gap seal surface and said mold component gap seal surface are separated by a second gap, and said second gap is sized to inhibit the flow of melt therein.

44. (new): A nozzle as claimed in claim 11, wherein said seal piece includes a second seal piece gap seal surface and said mold component includes a mold component gap seal surface and wherein said second seal piece gap seal surface and said mold component gap seal surface are separated by a second gap, and said second gap is sized to inhibit the flow of melt therein.

45. (new): A nozzle as claimed in claim 16, wherein said seal piece and said tip are entirely free of contact with each other.

46. (new): A nozzle as claimed in claim 22, wherein said tip is removably retained in position with respect to said nozzle body via said tip retainer.

47. (new): A nozzle as claimed in claim 30, wherein said tip is removably retained in position with respect to said nozzle body via said tip retainer.